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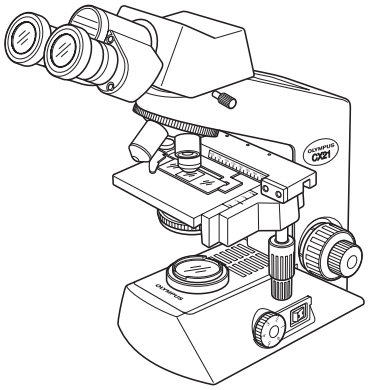

INSTRUCTIONS

CX21

EDUCATION MICROSCOPE

This instruction manual is for the Olympus Education Microscopes Model CX21. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this microscope, we recommend that you study this manual thoroughly before operating the microscope. Retain this instruction manual in an easily accessible place near the work desk for future reference.

IVD

AX7403

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IMPORTANT

⚠ SAFETY PRECAUTIONS

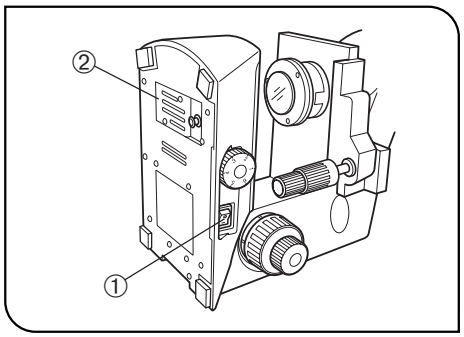


Fig. 1

1. After the equipment has been used in an observation of a specimen that is accompanied with a potential of infection, clean the parts coming in contact with the specimen to prevent infection.
   - Moving this product is accompanied with the risk of dropping the specimen. Be sure to remove the specimen before moving this product.
   - In case the specimen is damaged by erroneous operation, promptly take the infection prevention measures.
2. To avoid potential shock hazards and burns when replacing the lamp bulb, set the main switch 1 to "O" (OFF) then disconnect the power cord from the wall outlet in advance. Whenever you replace the bulb during use or right after use, allow the lamp socket 2 and bulb to cool before touching. (Fig. 1)

Applicable lamp bulb:	6V20WHAL halogen bulb (Philips Type 7388)

3. Install the microscope on a sturdy, level table or bench so as not to block the air vents on the underside of the base.
   Do not place the microscope on a flexible surface, as this could result in blocking the air vents and cause overheating or a fire.
4. Always use the power cord provided by Olympus. If no power cord is provided, please select the proper power cord by referring to the section "PROPER SELECTION OF THE POWER SUPPLY CORD" at the end of this instruction manual. If the proper power cord is not used, product safety performance cannot be warranted.
5. When installing the microscope, route the power cord away from the microscope frame. Should the power cord come in contact with a hot part, the power cord could melt and cause electric shock.
6. Always ensure that the **grounding terminal** of the microscope and that of the wall outlet are properly connected. If the equipment is not grounded, Olympus can no longer warrant the electrical safety performance of the equipment.
7. Never allow metallic objects penetrate into the air vents of the microscope frame as this could result in electrical shock, personal injury and equipment damage.
8. After operation or in case of abnormality, be sure to disconnect the power cord from the connector on the microscope or from the wall power outlet.

Safety Symbols

The following symbols are found on the microscope. Study the meaning of the symbols and always use the equipment in the safest possible manner.

Symbol	Explanation
	Indicates that the surface becomes hot, and should not be touched with bare hands.
	Before use, carefully read the instruction manual. Improper use could result in personal injury to the user and/or damage to the equipment.
I	Indicates that the main switch is ON.
O	Indicates that the main switch is OFF.

Warning Label

A warning indication label is attached to every part where special precaution is required when handling and using the microscope. Always heed the warnings.

Warning label position	Bottom of microscope frame	[Warning against high temperature in lamp bulb replacement]	

If the warning label is stained or peeled off, contact Olympus.

1 Getting Ready

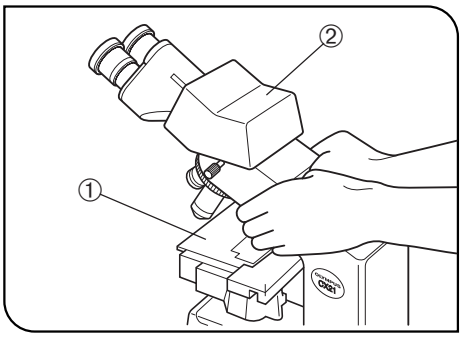


Fig. 2

1. A microscope is a precision instrument. Handle it with care and avoid subjecting it to sudden or severe impact.
2. Do not use the microscope where it is subjected to direct sunlight, high temperature and humidity, dust or vibrations. (For the operating conditions, see chapter 7, “SPECIFICATIONS” on Page 15.)
3. Always use the tension adjustment ring to adjust the rotation tension of the coarse adjustment knob.
4. The microscope is ventilated by natural convection. Be sure to leave enough spaces (10 cm or more) around it when installing it.
5. When carrying the microscope, hold both sides around the hole of the arm as shown in Fig. 2 and carry carefully.

★To prevent damage, do not hold the microscope by the stage ① or observation tube ②.
Be sure to remove the specimen; otherwise, it may fall.

2 Maintenance and Storage

1. Clean all glass components by wiping gently with gauze. To remove fingerprints or oil smudges, wipe with gauze slightly moistened with a mixture of ether (70%) and alcohol (30%).

⚠Since solvents such as ether and alcohol are highly flammable, they must be handled carefully. Be sure to keep these chemicals away from open flames or potential sources of electrical sparks — for example, electrical equipment that is being switched on or off. Also remember to always use these chemicals only in a well-ventilated room.

2. Do not attempt to use organic solvents to clean the microscope components other than the glass components. To clean them, use a lint-free, soft cloth slightly moistened with a diluted neutral detergent.
3. Do not disassemble any part of the microscope as this could result in malfunction or reduced performance.
4. When not using the microscope, ensure that the frame is cooled down and store it in a dry locker or cover it with a dust cover.

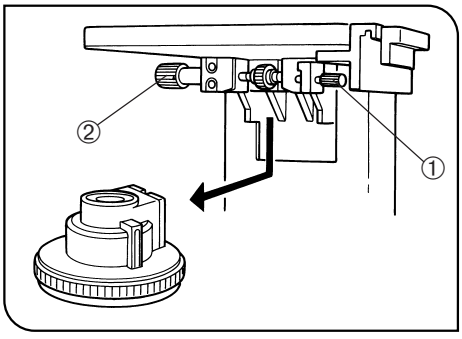


Fig. 3

5. To clean the condenser, fully loosen the securing knob ①, then remove the condenser by lowering it with the condenser height adjustment knob ②, and wipe the front lens of the condenser.
   The condenser can be attached by reversing the above removal procedure.
6. When disposing of the microscope. Check the regulations and rules of your local government and be sure to observe them.

3 Caution

If the microscope is used in a manner not specified by this manual, the safety of the user may be imperiled. In addition, the equipment may also be damaged. Always use the equipment as outlined in this instruction manual.

The following symbols are used to set off text in this instruction manual.

⚠ : Indicates that failure to follow the instructions in the warning could result in bodily harm to the user and/or damage to equipment (including objects in the vicinity of the equipment).

★ : Indicates that failure to follow the instructions could result in damage to equipment.

◎ : Indicates commentary (for ease of operation and maintenance).

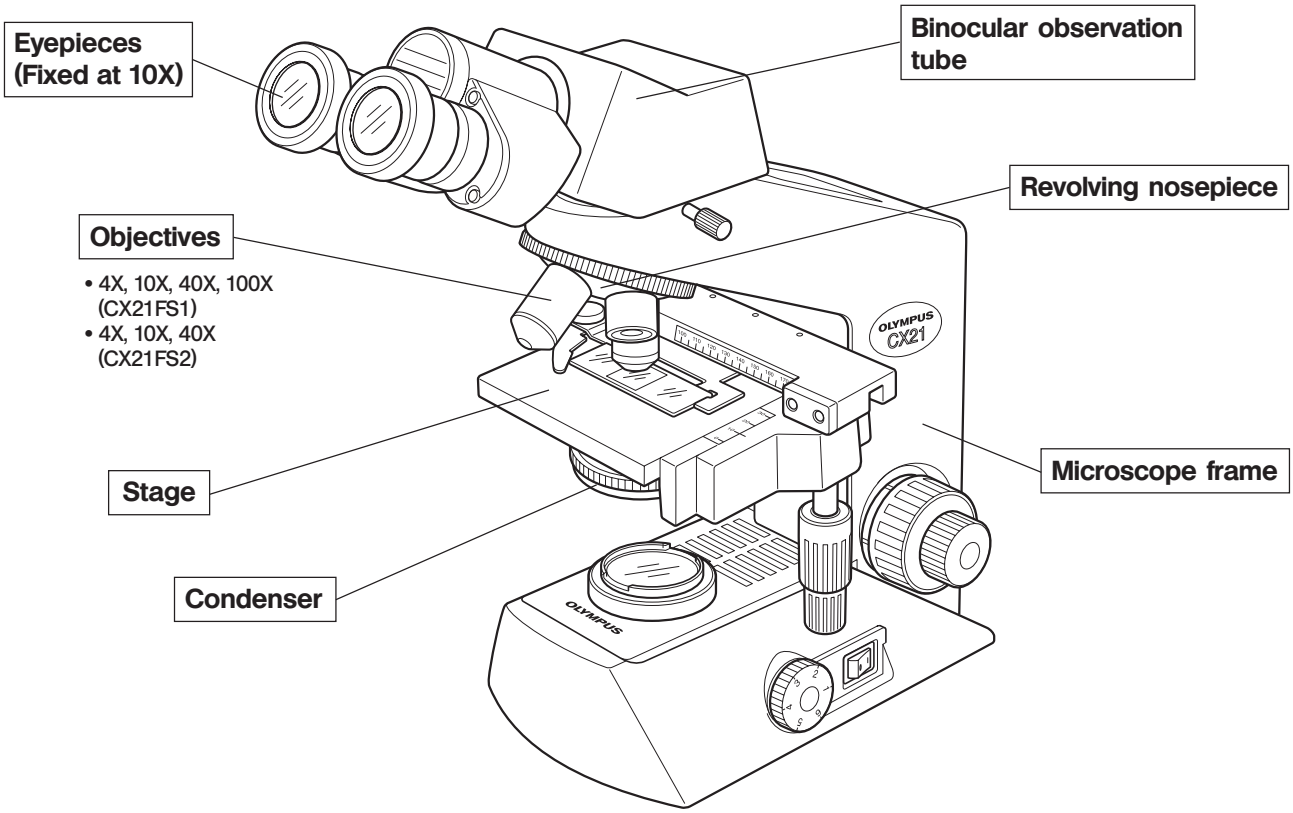
This device complies with the requirements of directive 98/79/EC concerning in vitro diagnostic medical devices. CE marking means the conformity to the directive.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

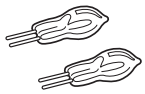
FCC WARNING: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1 STANDARD COMPONENT UNITS

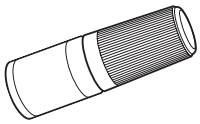
◎After opening the package, make sure that the correct component units for the selected set are present.
• The differences between the CX21FS1 and CX21FS2 lie in the number of objectives and presence of immersion oil.
★**The objectives have been screwed in tightly to prevent them from being loosened during transportation. To remove an objective, turn it counterclockwise while holding it with a rubber sheet, etc., so that your fingers don't slip.**



Daylight (blue) filter



6V20WHAL halogen bulb

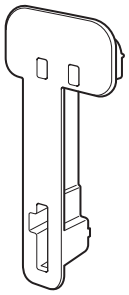


Immersion oil

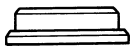
• Provided with a set including the 100X objective.

■ Optional Accessories

• Cord Hanger
CH3-CH



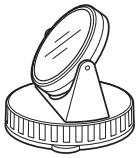
• Filter Holder
CH2-FH



• Darkfield Ring
CH2-DS

• Eyepieces
WHC15X
WHC15X-H

• Reflection Mirror
CH20-MM

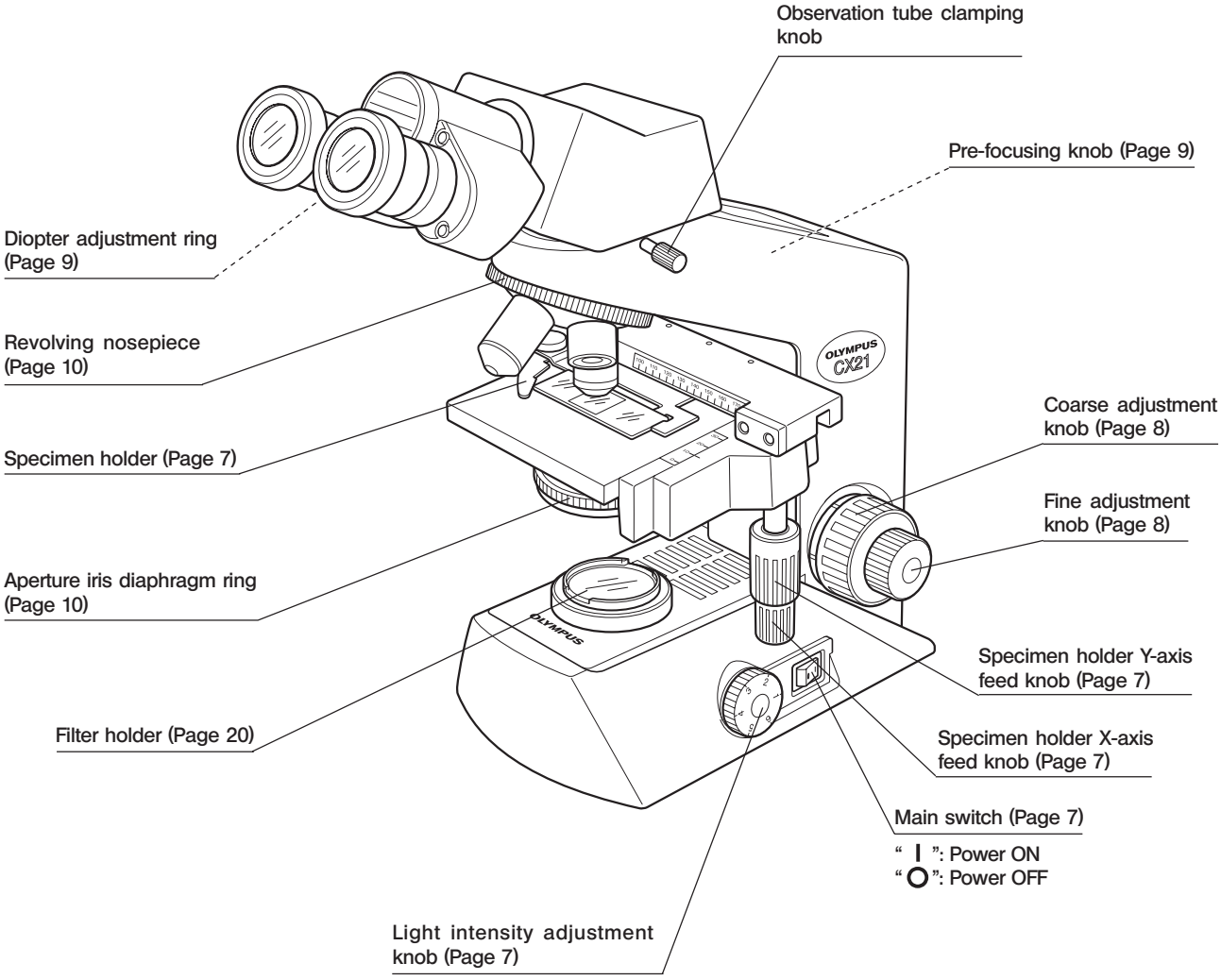


2 NOMENCLATURE

◎The following items have been attached at the factory to prevent deterioration during transport. Remove these items and retain them for future use. Then loosen the observation tube clamping knob and correct the orientation of the eyepieces as shown in the illustration below.

① Revolving nosepiece/observation tube transport band
② Stage and specimen holder protection sheet
③ Protective pad below the stage

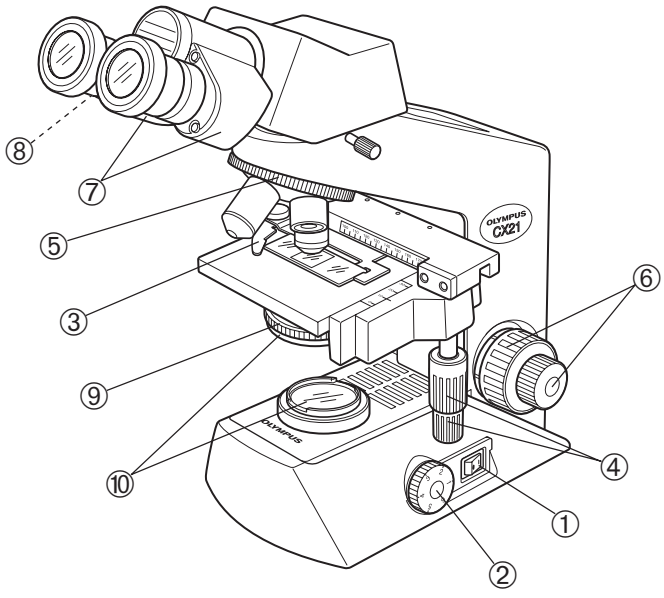
◎Attach the lamp bulb and power cord as described in chapter 9, "ASSEMBLY" on pages 17-18.


Observation tube clamping knob
Pre-focusing knob (Page 9)
Diopter adjustment ring (Page 9)
Revolving nosepiece (Page 10)
Specimen holder (Page 7)
Aperture iris diaphragm ring (Page 10)
Filter holder (Page 20)
Coarse adjustment knob (Page 8)
Fine adjustment knob (Page 8)
Specimen holder Y-axis feed knob (Page 7)
Specimen holder X-axis feed knob (Page 7)
Main switch (Page 7)
" I ": Power ON
" O ": Power OFF
Light intensity adjustment knob (Page 7)
OLYMPUS
CX21

◎For detailed description of each control, refer to the page indicated inside parentheses.

3 SUMMARY OF BRIGHTFIELD OBSERVATION PROCEDURE

	(Controls Used)	(Page)
Set the main switch to " I " (ON) and adjust the brightness.	①Main switch ②Light intensity adjustment knob	(P. 7) (P. 7)
Place the specimen on the stage.	③Specimen holder ④X-axis/Y-axis feed knobs	(P. 7) (P. 7)
Engage the 10X objective in the light path.	⑤Revolving nosepiece	(P. 10)
Bring the specimen in focus	⑥Coarse/fine focus adjustment knobs	(P. 8)
Adjust the interpupillary distance. Adjust the diopter.	⑦Binocular tube ⑧Diopter adjustment ring	(P. 9) (P. 9)
Adjust the aperture iris diaphragm.	⑨Aperture iris diaphragm ring	(P. 10)
Engage the objective to be used in the light path and bring the specimen in focus.	⑤Revolving nosepiece ⑥Coarse/fine adjustment knobs	(P. 10) (P. 8)
Engage the required filters.	⑩Filters (Diameter: 32.5 mm or 45 mm)	(P. 20)
Adjust the brightness.	②Light intensity adjustment knob	(P. 7)
Start observation.		



4 DETAILED OBSERVATION PROCEDURE

1 Turning the Lamp ON (Fig. 4)

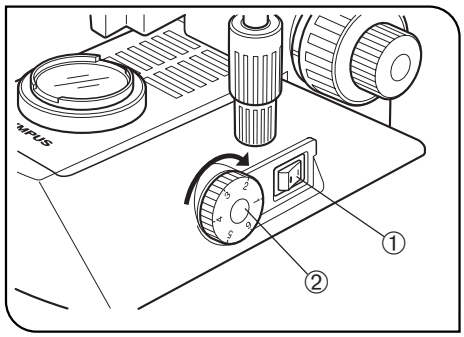


Fig. 4

1. Set the main switch ① to " **I** " (ON).
2. Rotating the light intensity adjustment knob ② in the direction of the arrow increases brightness and rotating it in the opposite direction decreases brightness. The figures around the knob indicate the reference voltage values.

2 Placing Specimen on the Stage (Fig. 5)

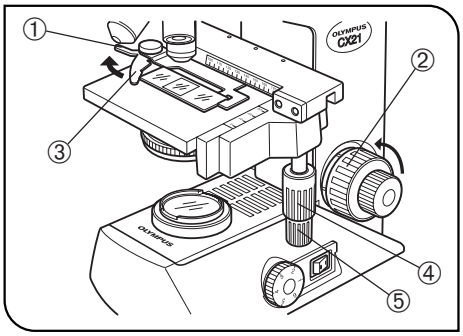


Fig. 5

★Place the specimen gently. If the bow-shaped lever is returned with a strong force or the knob ① of the bow-shaped lever is released in the middle, the slide glass may be broken.

1. Rotate the coarse adjustment knob ② in the direction of the arrow to fully lower the stage.
2. Open the bow-shaped lever ③ outward, place the specimen by sliding the specimen glass plates on the stage from the front toward the rear.
3. After sliding the specimen glass plates all the way, return the bow-shaped lever ③ gently.
4. Rotating the upper knob which is the Y-axis feed knob ④ moves the specimen in the vertical direction. Rotating the lower knob which is the X-axis feed knob ⑤ moves it in the horizontal direction.

★Do not move the specimen holder directly by hand, for this will damage the rotary mechanisms of the above knobs.

★When the specimen holder reaches the stopper position, the rotation force of the above knobs become heavy. Stop rotating the knob at this time.

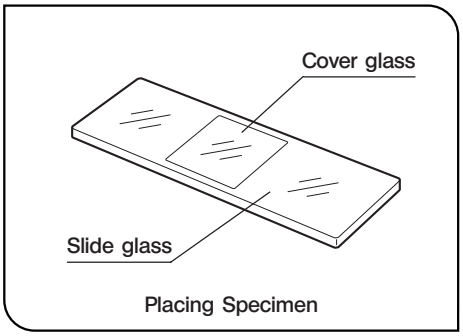


Fig. 6

Cover glass

This is the glass plate placed on the specimen. To allow the objective manifest the full performance, the cover glass thickness, which is the distance from its surface to the specimen surface, should ideally be 0.17 mm.

Slide glass

This glass plate should ideally have a length of 76 mm, width of 26 mm and thickness between 0.9 and 1.4 mm.

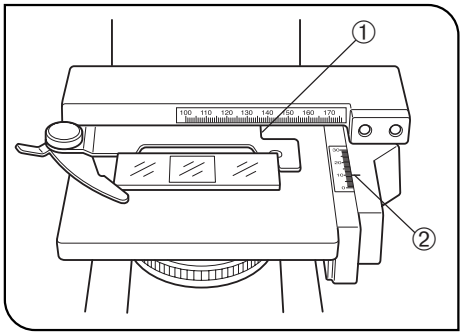


Fig. 7

Specimen holder scales (Fig. 7)

◎Theses scales allow the position (coordinates) being observed on the specimen to be identified. Even after the specimen is moved, it can be returned easily to the original position.

1. The horizontal coordinate can be read at position ① on the specimen holder.
2. The vertical coordinate can be read at the position of index line ②.

3 Adjusting the Focus (Fig. 8)

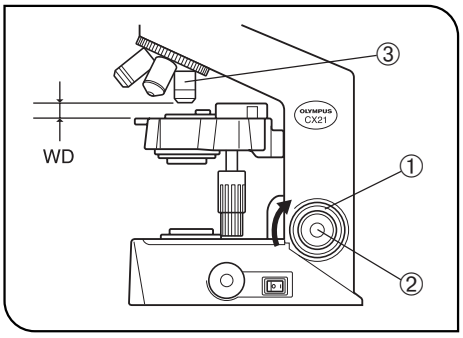


Fig. 8

Focusing Procedure

1. Rotate the coarse adjustment knob ① in the direction of the arrow so that the objective ③ is as close as possible to the specimen.
2. While observing the specimen through the eyepieces, slowly rotate the coarse adjustment knob ① in the opposite direction to the arrow to lower the stage.
3. When coarse focusing of the specimen is obtained, rotate the fine adjustment knob ② to adjust to precise focus.

Working Distance (WD)

◎The WD refers to the distance between each objective and the specimen, when precise focus of the specimen is obtained.

Objective Magnification	4X	10X	40X	100X
WD (mm)	18.5	10.6	0.6	0.13

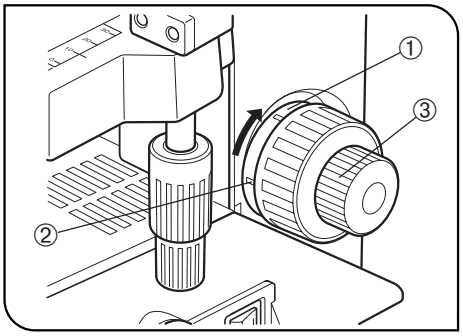


Fig. 9

Adjusting the Tension of the Coarse Adjustment Knob (Fig. 9)

1. The tension of the coarse focus adjustment knob has been designed adjustable with a ring. Insert the tip of a large flat-blade screwdriver into the groove ② on the tension adjustment ring ① and rotate the ring. Rotating it clockwise (in the direction of the arrow) increases the tension and counterclockwise decreases the tension.
2. If the stage descends on its own or if the specimen gets out of focus quickly even when it is brought into focus using the fine adjustment knob, it means that the tension of the coarse adjustment knob is too low. Turn the ring ① in the direction of the arrow to increase the tension.

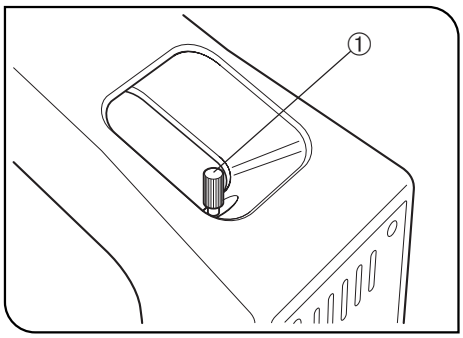


Fig. 10

Pre-focusing Knob (Fig. 10)

◎The pre-focusing knob controls the mechanism for preventing collision between the specimen and objective.

1. After bringing the specimen into focus, turn the pre-focusing knob ① inside the hole of the arm so that the pre-focusing mechanism hits the stage guide.
2. To provide a certain margin for focusing, rotate the knob by about half turn backward from the stopped position.

★**If the function of this mechanism is not required, set the pre-focusing knob ① at the highest position.**

4 Adjusting the Interpupillary Distance (Fig. 11)

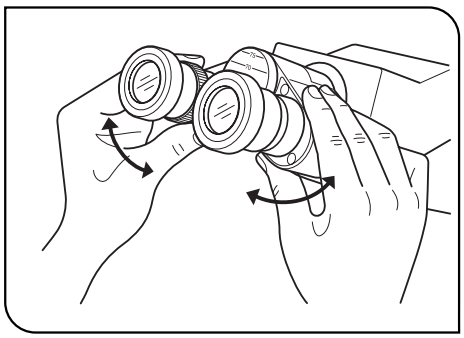


Fig. 11

◎The interpupillary distance adjustment consists of regulating the two eyepieces according to that between your eyes so that you can observe a single microscopic image through two eyepieces. This greatly helps to reduce fatigue during observation.

• While looking through the eyepieces, move both eyepieces until the left and right fields of view coincide completely.
The position of index dot • indicates the interpupillary distance value.

◎Note your interpupillary distance so that it can be quickly duplicated.

5 Adjusting the Diopter (Fig. 12)

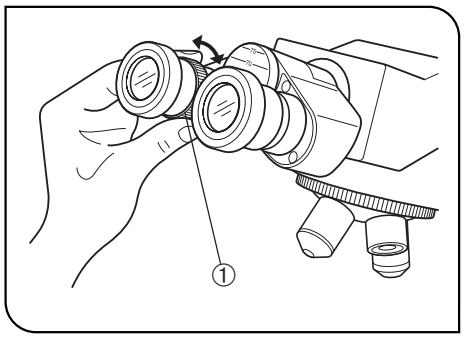


Fig. 12

◎The diopter adjustment consists of compensating for the difference in eyesight between your eyes.

1. While looking through the right eyepiece with your right eye, rotate the coarse and fine focus adjustment knobs to bring the specimen into focus.
2. While looking through the left eyepiece with your left eye, rotate only the diopter adjustment ring ① to focus on the specimen.

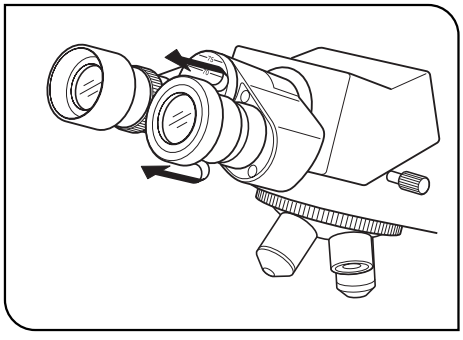


Fig. 13

Using the Eye Shades (Fig. 13)

When Wearing Eyeglasses

Use with the eye shades in the normal, folded-down position. This will prevent the eyeglasses from being scratched.

When Not Wearing Eyeglasses

Extend the folded eye shades in the direction of the arrow to prevent extraneous light from entering between the eyepieces and eyes.

6 Adjusting the Condenser Position and Aperture Iris Diaphragm (Fig. 14)

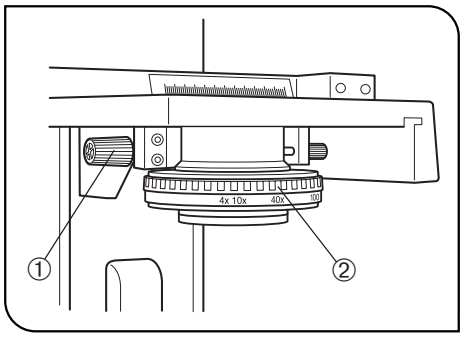


Fig. 14

◎ The condenser is usually used in the highest position. If the entire observed field of view is not bright enough, brightness may be improved by lowering the condenser slightly.

1. Rotate the condenser height adjustment knob ① to move the condenser to the highest position.
2. The aperture iris diaphragm ring ② has an objective magnification scale (4X, 10X, 40X, 100X). Rotate the ring so that the magnification of the objective in use faces frontward.

7 Switching the Objectives (Fig. 15)

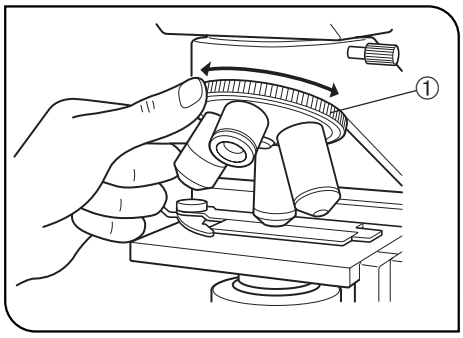


Fig. 15

Hold and rotate the revolving nosepiece ① so that the objective to be used come exactly above the specimen.

8 Using the 100X Immersion Objective (Fig. 16)

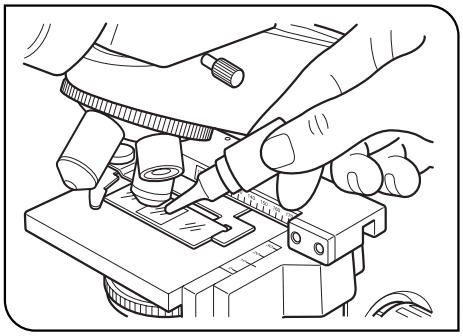


Fig. 16

◎The designated immersion oil should be attached to the top lens of the 100X immersion objective. Otherwise, the observed image will be unable to be focused on.

★Always use immersion oil supplied by Olympus.

1. Focus on the specimen using all objectives, starting from the lowest-power objective to higher-power objective.
2. Before engaging the immersion objective in the light path, place a drop of provided immersion oil onto the specimen at the area to be observed.
3. Rotate the revolving nosepiece to engage the immersion objective and rotate the fine adjustment knob to bring the specimen into focus.

★Since air bubbles in the oil will affect the image quality, make sure that the oil is free of bubbles.
To remove bubbles, rotate the revolving nosepiece slightly to move the oil-immersed objective by one reciprocation or two.

◎The condenser of this microscope manifests the full performance when oil is placed between the slide glass and the front lens of condenser. If oil is not attached there, the observation image may become slightly dark.

4. After use, remove oil from the objective front lens by wiping with gauze slightly moistened with an ether (70%)/alcohol (30%) mixture.

⚠Caution in use of immersion oil

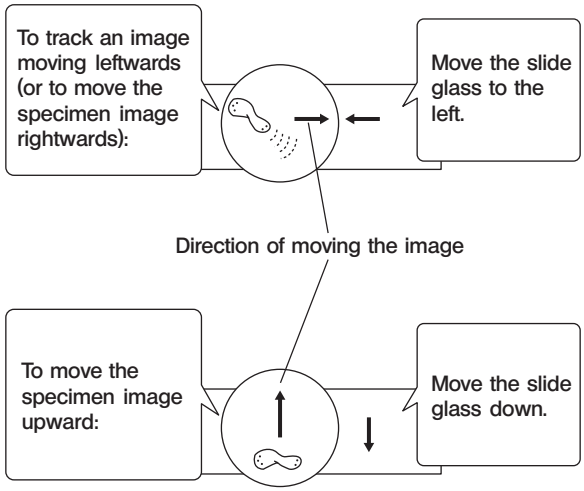
If immersion oil enters your eyes or contacts your skin, immediately take the following treatment.

Eyes: Rinse with fresh water (for 15 minutes or more).
Skin : Rise with water and soap.

If the appearance of the eyes or skin is altered or pain persists, immediately see your doctor.

5 ONE-POINT ADVICE

How To Track a Microscopic Image


To track an image moving leftwards (or to move the specimen image rightwards):
Move the slide glass to the left.
Direction of moving the image
To move the specimen image upward:
Move the slide glass down.

◎The image observed through the microscope moves in directions opposite to the actual up-down and left-right movements of the specimen.

Total Magnification

The size of the specimen image for observation is obtained by multiplying the eyepiece magnification by the objective magnification. This value is referred to as total magnification.

Example: Eyepiece (10X) x Objective (40X) = 400X

Resolution

Resolution determines how finely a lens is able to distinguish the details of a specimen.
The resolution of a microscope is mainly determined by the ability of the objective and is scarcely related to that of the eyepieces. The only function of the eyepieces is to magnify an image already resolved by the objective.
Although both configurations above provide the same total magnification, the higher magnification of the objective yields a better specimen resolution.

Field Number (FN)

The field number is the diameter of the image observed through an eyepiece, represented in millimeters.

10X eyepiece: 18 mm WHC15X: 12 mm

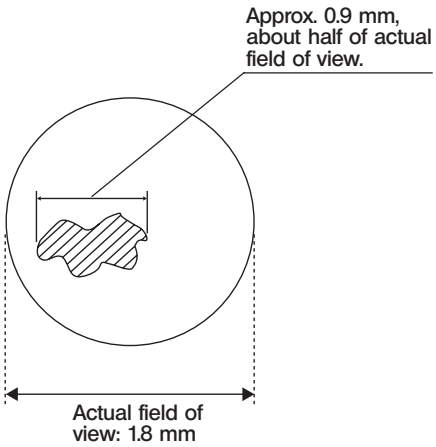
Actual Field of View

The actual field of view is the size on the specimen actually observed in the microscope. This yields approximate size of the actual specimen.

Actual field of view = Field number/Objective magnification

When the 10X eyepiece above and 10X objective are used, the actual field of view is equal to:

Actual field of view = 18/10 = 1.8 mm



6 TROUBLESHOOTING GUIDE

Under certain conditions, performance of the unit may be adversely affected by factors other than defects. If problems occur, please review the following list and take remedial action as needed. If you cannot solve the problem after checking the entire list, please contact Olympus for assistance.

Problem	Cause	Remedy	Page
1. Uneven brightness in observation field.	The objective is not engaged in the light path.	Engage the objective into position until it clicks.	10
	The condenser is too low.	Raise it to the upper limit.	10
	The objective, eyepiece, condenser and/or window lens are dirty.	Clean them thoroughly.	2
2. Dust or stains are visible in observation field.	The eyepiece, condenser, window lens and/or specimen glasses are dirty.	Clean them thoroughly.	2
3. Observation image glares.	The condenser is too low.	Raise it.	10
	The condenser iris diaphragm ring is stopped down excessively.	Adjust the aperture according to the objective magnification.	10
4. Observation image is whitish-blurred or unclear.	The objective is not engaged in the light path.	Engage the objective into position until it clicks.	10
	The objective, eyepiece, condenser and/or specimen glasses are dirty.	Clean them thoroughly.	2
	Immersion oil is not used with an immersion objective.	Use immersion oil.	11
	Bubbles are mixed in the immersion oil.	Remove the bubbles.	11
	The specified immersion oil is not used.	Use the immersion oil supplied by Olympus.	11
5. Part of image is defocused or image looks like it's flowing.	The objective is not properly engaged in the light path.	Engage the objective into position until it clicks.	10
	The specimen is not set properly on the stage.	Set the specimen correctly on the stage and secure using the specimen holder.	7
6. High-magnification objective touches specimen just before coming into focus.	The specimen is upside down.	Set the specimen correctly with the cover glass on the top.	7
7. The tension of coarse adjustment knob it too high.	The coarse adjustment knob tension adjustment ring is set too tight.	Loosen the ring to adjust to proper tension.	8
8. Focusing is impossible (because the stage cannot be raised).	The pre-focusing knob is positioned too low.	Raise its position.	9
9. The stage lowers by its own weight or focusing is lost due to slippage of the knob.	The coarse adjustment knob tension adjustment ring is set too loose.	Tighten the ring to adjust to proper tension.	8
10. Coarse focus adjustment cannot lower the stage low enough.	The condenser is too low.	Raise it.	10
11. Fields of view of two eyes do not match.	The interpupillary distance is not adjusted properly.	Adjust it properly.	9
	Diopter compensation for the two eyes is not set.	Adjust it correctly.	9
	The left and right eyepieces are different.	Replace one of them so that the left and right eyepieces are identical.	–

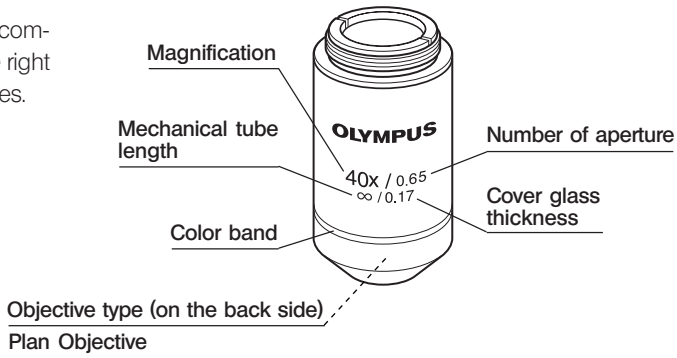
Problem	Cause	Remedy	Page
12. Objective hits the specimen when an objective is switched to a higher-magnification objective.	The specimen is upside down.	Set the specimen correctly with the cover glass on the top.	7
	The cover glass is too thick.	Use a cover glass with thickness of 0.17 mm.	7
13. Lamp bulb does not light.	Lamp bulb is not mounted.	Attach a bulb.	17
	Lamp bulb is blown.	Replace the bulb.	17
	The power cord is unplugged.	Plug it securely.	18
14. Lamp bulb blows easily.	The specified bulb is not used.	Replace with a specified bulb.	17

7 SPECIFICATIONS

Item	Specifications	
1. Optical system	UIS (Universal Infinity System) optical system	
2. Illumination	Built-in illumination system. 6 V, 20 W halogen bulb 6V20WHAL (PHILIPS 7388) (Average life time: Approx. 100 hr. when used as directed) 100-120/220-240 V ∿ 0.42/0.25A, 50/60 Hz	
3. Focusing mechanism	Stage height adjustment mechanism. Fine adjustment scale: 2.5 μm per graduation Fine adjustment stroke: 0.3 mm per turn Total stroke: 20 mm. Pre-focusing knob provided, coarse adjustment knob tension adjustable.	
4. Revolving nosepiece	Quadruple positions fixed (Front oriented)	
5. Binocular observation tube	Field number	18
	Tube tilting angle	30°
	Interpupillary distance adjustment range	48 to 75 mm
6. Stage	Size	120 x 132 mm (with mechanical stage)
	Movement range	76 (X-axis) x 30 (Y-axis) mm
	Specimen holder	Holds a single specimen.
7. Condenser	Type	Abbe condenser (daylight filter detachable)
	N. A .	1.25 (when immersed in oil)
	Aperture iris diaphragm	Built in
8. Dimensions & weight	154(W) x 391(H) x 238(D) mm, approx. 5.9 kg	
9. Operating environment	• Indoor use. • Altitude: Max. 2000 meters • Ambient temperature: 5° to 40°C (41° to 104° F) • Maximum relative humidity: 80% for temperatures up to 31°C (88°F), decreasing linearly through 70% at 34°C (93°F), 60% at 37°C (99°F), to 50% relative humidity at 40°C (104°F). • Supply voltage fluctuations; Not to exceed ±10% of the normal voltage. • Pollution degree: 2 (in accordance with IEC60664) • Installation/Overvoltage category: II (in accordance with IEC60664)	

8 OPTICAL CHARACTERISTICS

The following table shows the optical characteristics of combinations of eyepieces and objectives. The figure on the right shows the performance data engraved on the objectives.



Optical Characteristics / Objectives	Power	N.A.	W.D. (mm)	Cover Glass Thickness	Resolution (μm)	10X Eyepieces (FN 18)			Remark
						Total Power	Focal Depth (μm)	Actual Field of View	
Plan objective (FN 22)	4X	0.10	18.5	–	3.36	40X	175.0	4.5	
	10X	0.25	10.6	–	1.34	100X	28.0	1.8	
	40X	0.65	0.6	0.17	0.52	400X	3.04	0.45	
	100XO	1.25	0.13	–	0.27	1000X	0.69	0.18	Oil immersed

Legend

Working distance (WD) : Distance between the top surface of cover glass and the objective extremity.

Number of aperture (NA) : The figure corresponding to the F-number of the camera. This is associated with the resolution and larger NA means higher resolution.

Resolution : Ability of an objective for identifying adjacent two lines in the image, which is expressed in terms of the minimum distance between two points on the specimen surface.

Focal depth : (Object side) : The depth range of a specimen, in which focusing is obtained at a time. Stopping down the aperture iris diaphragm increases the focal depth and increasing the objective NA decreases it.

Field number (FN) : The diameter of the image observed through an eyepiece, represented in millimeters.

Actual field of view : Diameter of the field of view, expressed as the size on the specimen surface.

Total power : (Total magnification) Objective magnification x Eyepiece magnification.

9 ASSEMBLY

◎Each standard set can be assembled by simply attaching the lamp bulb, daylight (blue) filter and power cord.

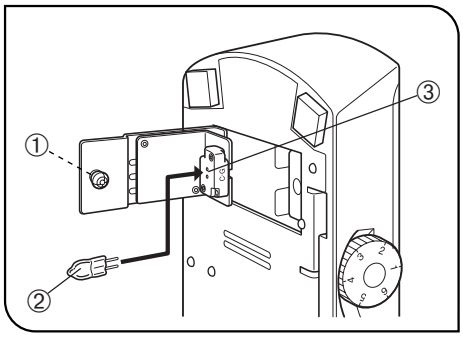


Fig. 17

1 Installing/Replacing the Lamp Bulb (Fig. 17)

★Before attaching the lamp bulb, remove the parts that may drop such as the filter and specimen from the microscope frame, and place it on the back so that the bottom can be seen from the front.

1. Pull the lock knob ① on the bottom to open the lamp bulb replacement cover.
2. Hold the halogen lamp bulb ② without taking it out of the polyethylene bag so as not to stain the bulb with fingerprints or stains, and push the bulb into the pin holes on the socket ③. After attaching, remove the polyethylene bag from it.

‹ Applicable lamp bulb ›

6 V, 20 W halogen bulb: 6V20WHAL (Philips Type 7388)

⚠Always use the designated bulb. Using a bulb other than a specified one may lead to a fire hazard.

⚠Fingerprints or stains on the lamp bulb reduce its service life. When it is contaminated, wipe with a cloth slightly moistened with alcohol.

3. With the lock knob left in the pulled-out position, close the lamp bulb replacement cover. Then push in the lock knob to lock the cover.

★The cover cannot be closed if the lock knob is in the pushed-in position. Make sure that it is in the pulled-out position before closing the cover.

Caution for Bulb Replacement During Use or Right After Use

⚠The bulb, lamp socket and areas near these will be extremely hot during and right after use. Set the main switch to " O " (OFF), disconnect the power cord from the wall outlet, then allow the old bulb and lamp socket to cool before replacing the bulb with a new bulb of the designated type.

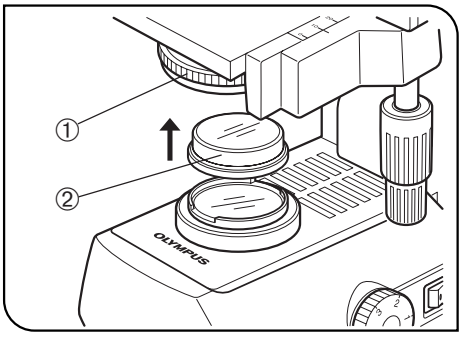


Fig. 18

2 Mounting the Daylight (Blue) Filter (Fig. 18)

◎This filter modifies the color of observation light into a natural color (daylight color).

• Slide the daylight filter ① into the bottom of the condenser ② until it clicks into place.

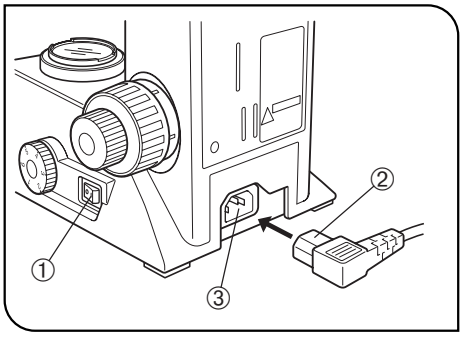


Fig. 19

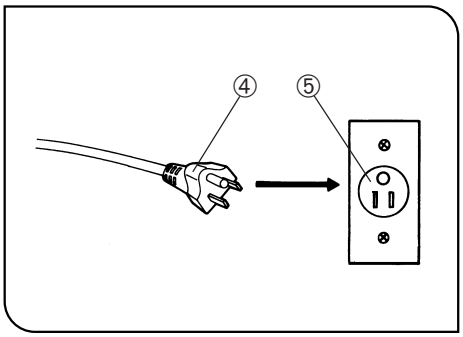


Fig. 20

3 Connecting the Power Cord (Figs. 19 & 20)

⚠ The power cord is vulnerable when bent or twisted. Never subject it to excessive force.

⚠ Make sure that the main switch ① is set to " O " (OFF) before connecting the power cord.

⚠ Always use the power cord provided by Olympus. If no power cord is provided, please select the proper power cord by referring to the section "PROPER SELECTION OF THE POWER SUPPLY CORD" at the end of this instruction manual.

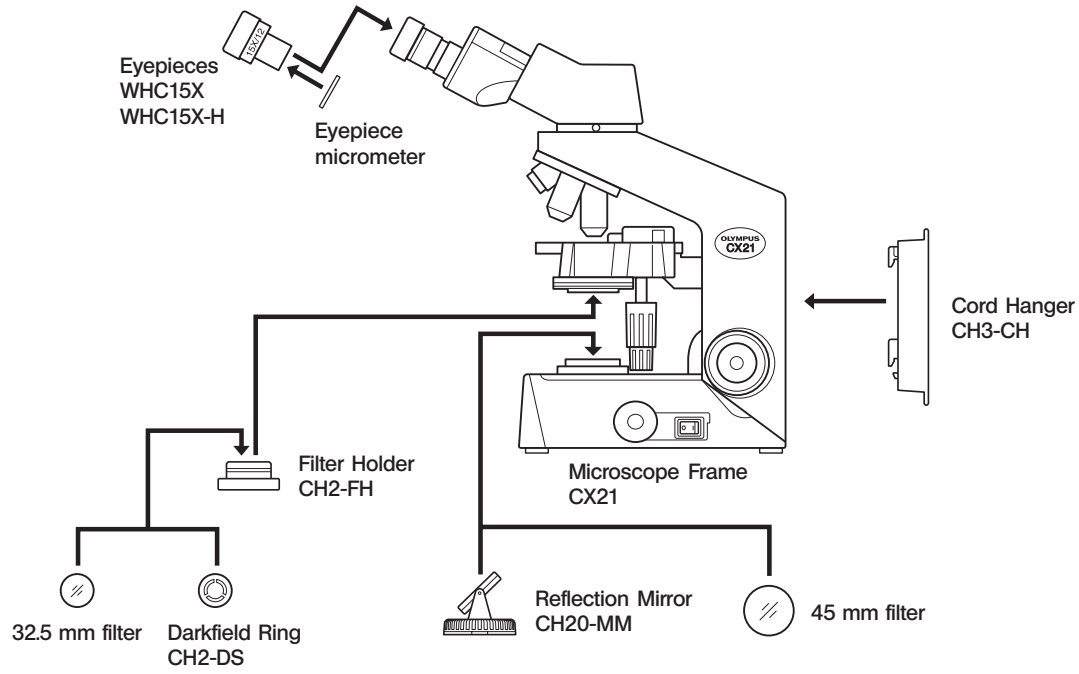
1. Connect the power cord's connector ② to connector ③ firmly.

⚠ Be sure to supply power from a grounded, 3-conductor power outlet using the proper power cord. If the power outlet is not grounded properly, Olympus can no longer warrant the electrical safety performance of the equipment.

2. Connect the power cord's plug ④ to a wall power outlet ⑤.

10 OPTIONAL ACCESSORIES

10-1 System Diagram of Optional Accessories



10-2 Installation and Operation of Optional Accessories

1 Cord Hanger CH3-CH (Figs. 21 & 22)

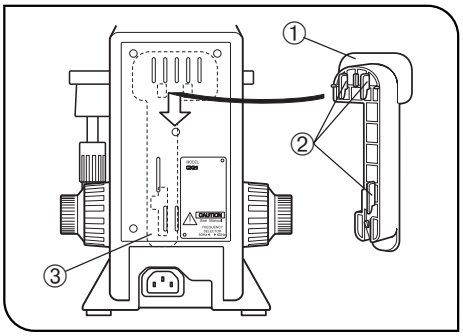


Fig. 21

◎When the CH3-CH cord hanger is attached on the back of the microscope frame, the power cord can be wound around it for storing.
Align the hooks ② of the cord hanger ① with the cord hanger mounting position ③, insert the cord hanger, push it firmly against the microscope frame and slide it down to lock it.

★**Do not carry the microscope by holding it by the cord hanger. If it is detached during transport, the microscope may drop and human injury may result.**

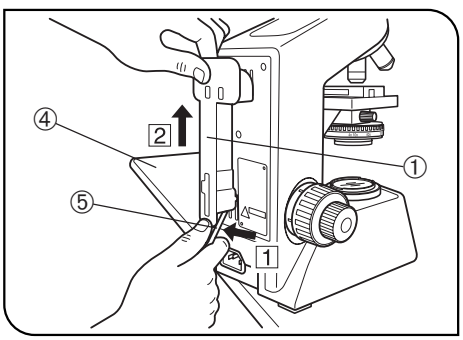


Fig. 22

Removal

⚠**First remove the power cord from the cord hanger to prevent electric shock.Then,move the microscope to an edge of the table ④. While pushing the cord hanger ① in the directions 1 and 2 , insert the tip of a flat-blade screwdriver ⑤ or similar tool into the lower part of the hanger and slide it up to remove.**

2 Filter Holder CH2-FH (Fig. 23)

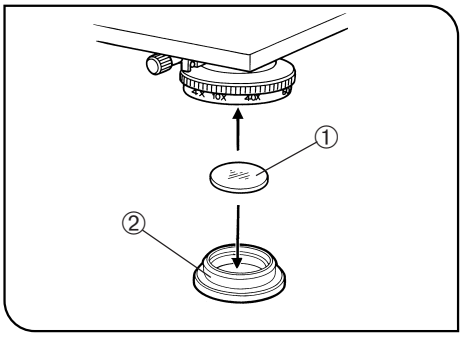


Fig. 23

This accessory accommodates a filter with a diameter of 32.5 mm or the CH2-DS darkfield ring.

1. Remove the daylight filter if it has been attached.
2. Push the filter holder ② containing the desired filter ① into the bottom of the condenser until it clicks into place.

Filter	Application
32.5C	Changes the light of the built-in lamp bulb (which is yellowish) to natural light.
32.5G533	Reduces fatigue or provides specimen with contrast.
32.5LB45, 150, 200	Converts the color of light for color photography (with a daylight film).

For other filters, contact Olympus.
Filters similar to the above having a diameter of 45 mm are also available for insertion in the window lens.

3 Darkfield Ring CH2-DS (Fig. 24)

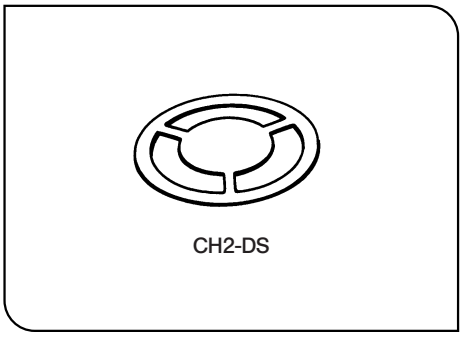


Fig. 24

1. Insert the darkfield ring in the CH2-FH filter holder in the same way as inserting a filter.
2. The darkfield ring enables darkfield observation using an objective from 4X to 40X.

4 Reflection Mirror CH20-MM (Fig. 25)

◎The reflection mirror is designed to be used in microscopic observation in a location where power supply is not available. It makes it possible to use the natural light in place of the lamp bulb.

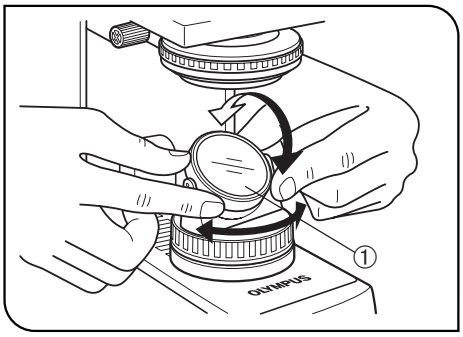


Fig. 25

★The microscope should be installed near a window, in a place that is not exposed to direct sunlight.
The eyepieces should be oriented toward the rear so that the reflection mirror receives the bright light. Loosen the observation tube clamping knob and rotate the tube by 180°.

1. Fit the reflection mirror in the window lens of the microscope frame by aligning the mounting tab.
2. Remove the daylight filter because it renders the image bluish under natural light.
3. The reflection mirror ① should be pointed toward the bright area. While observing the image through eyepieces, adjust the orientation of the reflection mirror.

◎A planar reflection mirror is used normally. However, if the image brightness is uneven or the outside view is visible in the image, use a concave reflection mirror.

5 Eyepieces WHC15X/WHC15X-H (Fig. 26)

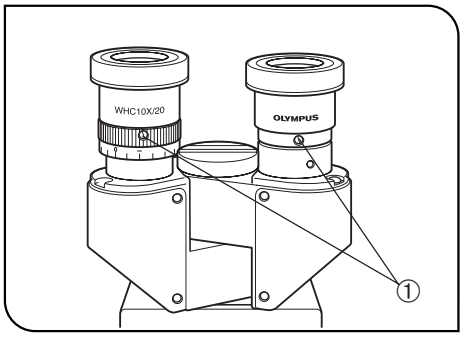


Fig. 26

◎The standard 10X eyepieces are clamped using screws.

1. Using a small flat-blade screwdriver, loosen the clamping screw ① of a 10X eyepiece and remove it.
2. Insert the WHC15X or WHC15X-H into the eyepiece sleeve and tighten the clamping screw ①.

6 Using the eyepiece micrometer (Fig. 27)

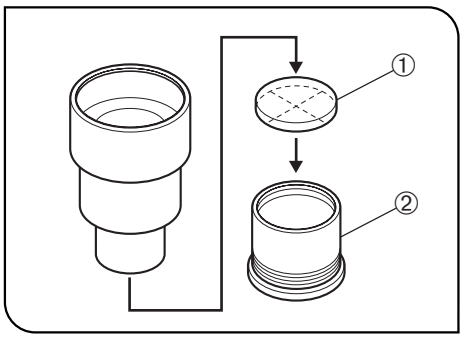


Fig. 27

◎The eyepiece micrometer can be inserted in a standard 10X eyepiece as well as the WHC15X and WHC15X-H.
However, unless the WHC15X-H is used, helicoid adjustment cannot be performed, so those with poor eyesight will have trouble in bringing the micrometer into focus.

- Get a micrometer with diameter of 19 mm and thickness of 1 mm.
- Remove the micrometer sleeve ② and fit the micrometer ① into the eyepiece with the indication side facing down as shown in Fig. 27. Replace the micrometer sleeve to use the micrometer.

PROPER SELECTION OF THE POWER SUPPLY CORD

If no power supply cord is provided, please select the proper power supply cord for the equipment by referring to " Specifications " and " Certified Cord " below:

CAUTION: In case you use a non-approved power supply cord for Olympus products, Olympus can no longer warrant the electrical safety of the equipment.

Specifications

Voltage Rating	125V AC (for 100-120V AC area) or, 250V AC (for 220-240V AC area)
Current Rating	6A minimum
Temperature Rating	60°C minimum
Length	3.05 m maximum
Fittings Configuration	Grounding type attachment plug cap. Opposite terminates in molded-on IEC configuration appliance coupling.

Table 1 Certified Cord

A power supply cord should be certified by one of the agencies listed in Table 1 , or comprised of cordage marked with an agency marking per Table 1 or marked per Table 2. The fittings are to be marked with at least one of agencies listed in Table 1. In case you are unable to buy locally in your country the power supply cord which is approved by one of the agencies mentioned in Table 1, please use replacements approved by any other equivalent and authorized agencies in your country.

Country	Agency	Certification Mark	Country	Agency	Certification Mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET, JQA, TÜV, UL-APEX / MITI	
Austria	ÖVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA BSI	
Germany	VDE		U.S.A.	UL	
Ireland	NSAI				

Table 2 HAR Flexible Cord

APPROVAL ORGANIZATIONS AND CORDAGE HARMONIZATION MARKING METHODS

Approval Organization	Printed or Embossed Harmonization Marking (May be located on jacket or insulation of internal wiring)		Alternative Marking Utilizing Black-Red-Yellow Thread (Length of color section in mm)		
			Black	Red	Yellow
Comite Electrotechnique Belge (CEBEC)	CEBEC	‹HAR›	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prüfstelle	‹VDE›	‹HAR›	30	10	10
Union Technique de l´Electricite´ (UTE)	USE	‹HAR›	30	10	30
Instituto Italiano del Marchio di Qualita´ (IMQ)	IEMMEQU	‹HAR›	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC	‹HAR›	10	10	30
N.V. KEMA	KEMA-KEUR	‹HAR›	10	30	30
SEMKO AB Svenska Elektriska Materielkontrollanstalter	SEMKO	‹HAR›	10	10	50
Österreichischer Verband für Elektrotechnik (ÖVE)	‹ÖVE›	‹HAR›	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	‹DEMKO›	‹HAR›	30	10	30
National Standards Authority of Ireland (NSAI)	‹NSAI›	‹HAR›	30	30	50
Norges Elektriske Materiellkontroll (NEMKO)	NEMKO	‹HAR›	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	‹UNED›	‹HAR›	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT	‹HAR›	30	30	70
Instituto Portages da Qualidade (IPQ)	np	‹HAR›	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV	‹HAR›	10	30	90
Elektriska Inspektoratet	SETI	‹HAR›	10	30	90

Underwriters Laboratories Inc. (UL)	SV, SVT, SJ or SJT, 3 X 18AWG
Canadian Standards Association (CSA)	SV, SVT, SJ or SJT, 3 X 18AWG

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